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10/561,422	12/19/2005	Kai Sorge	AG009	6390

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EXAMINER	
COMLEY, ALEXANDER BRYANT	
ART UNIT	PAPER NUMBER
3746	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/561,422	SORGE, KAI	
	Examiner	Art Unit	
	ALEXANDER B. COMLEY	3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 December 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *13,15 and 17-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *13,15 and 17-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of the Claims

1. The Examiner acknowledges receipt of Applicant's amendments, remarks, and arguments filed with the Office on December 7th, 2009 in response to Non-Final Office Action mailed by the Office on July 7th, 2009. Per Applicant's response, all other claims remain in their previously presented form. Hence, Claims 13, 15, & 17-23 remain pending in the instant application. The Examiner has carefully considered each of Applicant's amendments and arguments, and they will be addressed below.

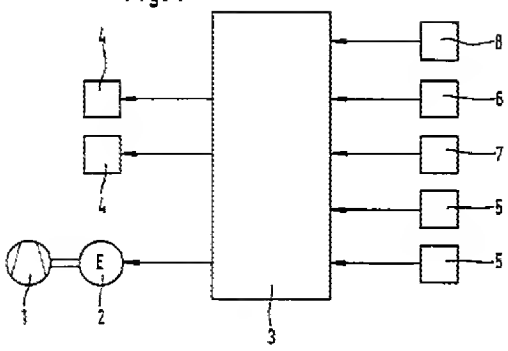
Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 13, 17-18, 20, & 24** are rejected under 35 U.S.C. 102(b) as being anticipated by United States Patent to Kutscher et al. (6,212,451) to a Pneumatic Suspension Leveling System for Vehicles.

Fig. 1



Regarding Independent **Claim 13**, and in reference to Figure 1 shown immediately above, Kutscher et al. (6,212,451) discloses a compressor control system that cycles a compressor unit on or off, depending on estimated threshold heating/cooling values that are indirectly calculated using a thermal modeling analysis. Kutscher's control system also utilizes thermodynamic properties and relationships existing between the compressor and the surrounding air which are taken into account when calculating these threshold values. To begin, Kutscher discloses, "The invention is based on the concept of selectively varying the compressor on-time (relative and absolute), whereby the current on-time duration in each case is matched to prevailing compressor operating conditions. The functional parameter for determine a desirable compressor on-time duration is varied are the heat transfer conditions which prevail between the compressor and the air enveloping the latter. " (Column 2, Lines 13-21) Hence, Kutscher's control system is designed such that compressor overheating is effectively avoided. In regards to this overheating, Kutscher states "When using electrically driven compressors, the compressor heats up markedly during with continuous operation over longer periods of time, which leads to compressor overload and damage and, consequently, can lead to pneumatic suspension leveling system

failure." (Col. 1, Lines 33-37) Kutscher goes on to state how environmental operating parameters (i.e. air temperature, mounting position, etc) directly affect the temperature of the compressor by stating "The speed with which the compressor heats up during its operation is a function of different limiting conditions such as, for example, mounting position of the compressor on the vehicle, air temperature, compressor air flow charging speed. The operating conditions resulting from these limiting conditions for the compressor can delay or accelerate compressor heating." (Col. 1, Lines 56-63) This statement alone makes it quite apparent that the surrounding air temperature and other environmental parameters (i.e. cooling and heating properties of the compressor) directly affect the compressor temperature, and therefore serve as a method of estimating (indirectly and cyclically) and regulating the temperature of the compressor itself. Kutscher further discloses "These temperatures are preferably detected by an appropriate sensory mechanism, whereby signal values correlating thereto are generated, which the control device processes to determine air temperature in the compressor environment. Accordingly, air temperature in the compressor environment is not measured directly in this compressor environment but, rather, is indirectly determined with the aid of a corresponding, modeling analysis based on the outside vehicle temperature and vehicle engine air-intake temperature. In this manner, recourse can be made in particular to sensory mechanism already existing on the vehicle with which said temperatures are measured in any case." (Column 2, Lines 39-51) Hence, Kutscher measures the temperature of the intake air and the surrounding air proximate the compressor to provide a novel method of indirectly and cyclically estimating the

temperature (i.e. a relative temperature) of the compressor itself. The Examiner must assert that the term "estimate" is important here, since Applicant has merely claimed that the compressor temperature is estimated; not directly measured or sensed (i.e. with a sensor). Consequently, Kutscher's system meets the limitation of the claim because it estimates the temperature of the compressor using measured environmental parameters. To this, as part of Kutscher's method, a compressor operating/heating function that first calculates a set of physical compressor-influencing variables (i.e., ambient temperature of surroundings, air flow speed, etc) is utilized. This function uses these values/variables to estimate an overall compressor temperature, and then determines (based on operating requirements) exactly how the compressor should function at a given instant in time. Hence, the compressor temperature is indirectly estimated through use of heat transfer rates (i.e. a heating function relative to the surrounding air) experienced between the compressor and the air. To conclude, the Examiner must assert that because Kutscher measures and regulates the compressor's operation (i.e. temperature) using the direct correlation existing between the surrounding environment temperature and the temperature of the compressor itself, Kutscher control system does, in fact, provide an indirect, and cyclic, method of estimating the temperature of the compressor.

4. In regards to dependent **Claims 17-18**, Kutscher discloses a compressor operating process that determines a set of physical compressor-influencing variables (i.e., ambient temperature of surroundings, air flow speed), uses these values to

estimate an overall compressor temperature, and then determines, based on these values and current operating requirements, exactly how the compressor should function at a given instant in time. Applicant's use of subtracting a cooling value or adding a heating value to acquire the estimated relative temperatures is a step that would naturally occur in such a system process. In particular, Kutscher discloses "The heat transfer conditions prevailing between the compressor and the air enveloping the latter can depend to a large extent on the air temperature and air flow speed prevailing in the compressor environment. With a preferred special embodiment of the pneumatic suspension leveling system in accordance with the invention, therefore, the control device is able to vary the on-time duration of the compressor as a function of the air temperature and air flow speed prevailing in the compressor environment." (Column 2, Lines 22-30) In regards to dependent **Claim 20**, Kutscher discloses using initial relative temperature values that correspond to ambient air temperature surrounding the compressor. Kutscher also specifically notes that such starting values should be based on the particular compressor model to be used (See Column 3, Lines, 59-61; Column 4, Lines 10-13; Column 4, Lines 27-29). In particular, Kutscher discloses "The following values, for example, are possible as vehicle reference or starting operating parameters or as environmental conditions of compressor operation with which base on-time duration ED_{Basis} is determined: G_{FG} =50° km/h at T_{AT} = 20° C and T_{FT} = 60° C." (Column 4, Lines 51-55) Furthermore, in regards to dependent **Claim 24**, Kutscher's control system is one that can initiate, or halt, compressor operation during various points in the allowable temperature range between a minimum and a maximum temperature. In

particular, Kutscher discloses "The invention is based on the concept of selectively varying the compressor on-time (relative and absolute), whereby the current on-time duration in each case is matched to prevailing compressor operating conditions." (Column 2, Lines 13-17) Kutscher further discloses the general operating conditions that the compressor follows by stating "Preferably, on-time duration is decreased then air temperature increases and/or air flow speed decreases and is increased when air temperature decreases and/or air flow speed increases." (Column 2, Lines 29-33)

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. **Claims 15, 19, & 21** are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent to Kutscher et al. (6,212,451) to a Pneumatic Suspension

Leveling System for Vehicles in view of United States Patent to Meier et al. (6,799,950) to a Method and Apparatus for Controlling a Compressor.

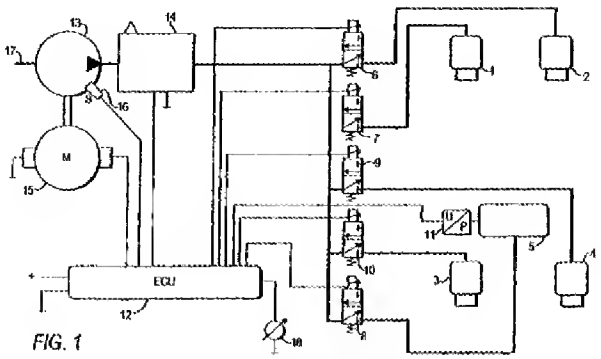


FIG. 1

In regards to dependent **Claim 15**, and in reference to Figure 1 shown immediately above, the Meier portion of the combination specifically discloses using the backpressure in the compressor system in order to accurately estimate compressor temperature. In particular, Meier discloses "A method and apparatus for controlling a compressor suitable for delivery of pressurized fluid to a pressurized fluid system, wherein the delivery of the pressurized fluid to the pressurized fluid system can be cycled on and off as a function of a temperature signal received from a temperature sensor. The delivery of pressurized fluid is turned off when the temperature signal exceeds a temperature limit value that is based on the backpressure caused by the pressurized fluid system." (Abstract)

In regards to dependent **Claim 19**, the Kutscher portion of the combination discloses the use of coefficient-based equations to determine the increments of operational time for the compressor under different loadings and sensed surrounding conditions. In particular, Kutscher discloses "On the basis of conceptual models it is now possible for the control device 3 to calculate a signal

value S_{LT} from the signal values S_{AT} and S_{FT} made available to it which correlate to the outside vehicle temperature T_{AT} and to the vehicle engine air-intake temperature T_{FT} which correlates to the air temperature in the compressor vicinity. Likewise, with corresponding conceptual models a signal value S_{LG} can be calculated from the signal value F_{FG} correlating to the vehicle speed G_{FG} which correlates to the air flow speed G_{LG} in the compressor environment." (Column 3, Lines 36-44) Kutscher further explains the specific equations used, and the influencing factors used for each (See Column 3, Line 46 – Column 4, Line 50) From these equations, it is clear that Kutscher's "influencing variables" serve the same purpose as applicant's "constant coefficient matrices" in that they characterize the particular compressor used and its particular surroundings. Furthermore, Kutscher discloses the claimed invention except for the specific algebraic forms of the operating equations used. However, it would have been an obvious matter of design choice to utilize such equation forms, since applicant has not disclosed that such particular equations solve any stated problem or are for any particular purpose, and it appears that the invention would perform equally well with the similar equation forms seen in Kutscher. regarding dependent **Claim 21**, Kutscher specifically describes using appropriate starting values for the control system based on corresponding compressors used and their environments. Kutscher also notes that such starting values are to be based on the particular compressor model used (See Column 3, Lines, 59-61; Column 4, Lines 10-13; Column 4, Lines 27-29) Therefore, Kutscher discloses

the claimed invention except for the particular initial relative temperature value of "zero". However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize an initial relative temperature of "zero", since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)* Therefore, to one of ordinary skill desiring an efficiently operated compressor unit that avoids damage from overheating, it would have been obvious to utilize the techniques disclosed in Meier in combination with those seen in Kutscher in order to obtain such a result. Consequently, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the compressor control method of Kutscher with the counterpressure readings seen in Meier in order to obtain predictable results; those results being a more precisely controlled compressor that prevents overheating while still avoiding complete reliance on direct temperature readings for temperature estimations.

9. **Claims 22-23** are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent to Kutscher et al. (6,212,451) in view of United States Patent to Meier et al. (6,799,950) as applied to claims 15, 19, & 21 above, and further in view of United States Patent to Jayanth et al. (6,758,051) directed to a Method and System for Diagnosing a Cooling System.

Regarding dependent **Claim 22**, the Kutscher-Meier portion of the

combination discloses the steps of applicant's method, with the exception of step "c"; that step being the specific measurement of the compressor's voltage. However, the additional Jayanth reference of the combination specifically discloses the use of a voltage sensor in a compressor control system. In particular, Jayanth discloses "The diagnostic system also includes either a discharge pressure sensor or a condenser temperature sensor, an ambient air sensor and a voltage sensor. The sensors provide information to the diagnostic system to enable it to determine and indicate a system fault." (Abstract) More particularly, Jayanth discloses "The demand signal for compressor 10 is acquired by sensing the presence of supply voltage or by having a system controller (not shown) supply a discrete signal representing the demand. The demand signal and the signal received by logic circuitry 104 are processed by logic circuitry 104 to derive the information about the trip frequency of protector 54 and the average ON time and OFF time of compressor 10. Logic circuitry 104 analyses the combination of current signals, the demand signal and the derived protector trip frequencies to determine if a fault condition (i.e. overheating or overload) exists." (Column 6, Lines 3-33) In regards to dependent **Claim 23**, Kutscher substantially teaches the use, or omission, of an influencing variable based on operating condition. Furthermore, applicant's claim essentially describes that the use, or omission, of a particular variable based on compressor operation. Therefore, Kutscher discloses the claimed invention except for the specific multiplication step used to utilize (multiply by "one") or omit (multiply

by "zero") an influencing variable. It would have been obvious to one having ordinary skill in the art at the time the invention was made to perform these basic multiplications, since it has been held that omission of an element (multiplying by zero) and its function in a combination where the remaining elements perform the same functions as before involves only routine skill in the art. *In re Karlson, 136 USPQ 184.* Therefore, to one of ordinary skill desiring an accurately controlled compressor system, it would have been obvious to utilize the techniques disclosed in Jayanth in combination with those seen in the Kutscher-Meier combination in order to obtain such a result. Consequently, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the compressor control system of the Kutscher-Meier combination with the voltage detection sensors of Jayanth in order to obtain predictable results; those results being a more precisely controlled compressor system that prevents overheating by avoiding complete reliance on temperature readings for its temperature calculations.

Response to Arguments

10. Applicant's arguments filed December 7th, 2009 have been fully considered but they are not persuasive. The Examiner's responses can be seen below.

11. In regards to Applicant's argument that Kutscher does not estimate the temperature of the compressor, the Examiner must once again respectfully disagree.

As stated previously by the Examiner, Kutscher specifically states that the compressor on-time is varied and controlled based on the heat transfer conditions which prevail between the compressor and the surrounding environment. The Examiner must assert that in considering these heat transfer conditions, Kutscher does, in fact, estimate the compressor temperature in a cyclic and indirect manner (i.e. without a temperature sensor). Kutscher makes it clear that there exists a direct correlation between the compressor temperature and the surrounding air temperature. The surrounding environment (i.e. air) is measured by a given sensor, and this temperature is then utilized as an input in a thermal model that indirectly determines the compressor's temperature. Kutscher specifically states "The invention is based on the concept of selectively varying the compressor on-time (relative and absolute), whereby the current on-time duration in each case is matched to prevailing compressor operating conditions. The functional parameter for determine a desirable compressor on-time duration is varied are the heat transfer conditions which prevail between the compressor and the air enveloping the latter." (Column 2, Lines 13-20) Hence, Kutscher's control system is designed such that compressor overheating is effectively avoided. In regards to this overheating, Kutscher states "When using electrically driven compressors, the compressor heats up markedly during with continuous operation over longer periods of time, which leads to compressor overload and damage and, consequently, can lead to pneumatic suspension leveling system failure." (Col. 1, Lines 33-37) Kutscher goes on to state how environmental operating parameters (i.e. air temperature, mounting position, etc) directly affect the temperature of the compressor by stating "The speed

with which the compressor heats up during its operation is a function of different limiting conditions such as, for example, mounting position of the compressor on the vehicle, air temperature, compressor air flow charging speed. The operating conditions resulting from these limiting conditions for the compressor can delay or accelerate compressor heating." (Col. 1, Lines 56-63) This statement alone makes it quite apparent that the surrounding air temperature and other environmental parameters (i.e. cooling and heating properties of the compressor) directly affect the compressor temperature, and therefore serve as a method of estimating (indirectly and cyclically) and regulating the temperature of the compressor itself.

Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEXANDER B. COMLEY whose telephone number is (571)270-3772. The examiner can normally be reached on M-F 7:30am - 5:00am EST (Alternate Fridays Off). If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon C. Kramer can be reached on (571)-272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Alexander B Comley/
Examiner, Art Unit 3746

/Charles G Freay/
Primary Examiner, Art Unit 3746

ABC
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